Semantic Network Representation of Female Related issues from the Holy Quran

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ABSTRACT

Quran is the main source of knowledge and has been a major source reference for all types of problems. Female is one of terms that are very popular in the Quran. This term represents a group of human that are venerable in the aspect of social and family. Quran contains many important issues related to the female. However understanding the issues and the solution from the Quran is difficult due to lack of understanding of Quran literature. Furthermore, female has been addressed in the Quran through several other terms such as women, lady and girls depending on the issues that being addressed. In this paper, 16 terms that are related to female and its related surah and verse have been identified. Semantic network is used to represent the issues. This study also found that, semantic network representation provide a clear and brief overview of the issue that is easy to understand and comprehend.

Keywords: Knowledge Representation, Semantic Network, Female Term, Quran Representation, Female Issue

I   INTRODUCTION

The Quran contains valuable information and gives answer and solution to many problems facing mankind. It contains 114 *surah* or chapters and each surah contains verses or *ayat*. In total the Quran contains 77,000 words and 6200 verses. Scholars on Quran in the past have been authoring books highlighting various linguistic, stylistic, scientific, rhetorical, and many hidden discoveries from the Quran in various other fields. These have been done through their personal knowledge on the Quran as there were no computational tools available. The Quran is characterized by holding vast information in unstructured and scattered–yet conceptually related- verses. All these features make the Quran an attractive target for finding new information from the Quran in terms of hidden trends, relationships, patterns, coincidences and associations. However, text extraction has been seen as a difficult process because text data are unstructured data. One method that can be used to analyze this type of data is text mining. Examples of research on text mining related to the Quran are grammatical parsing for the Quran (Salih, 2007; Al-Kharrat, 2007; Darwish, 1999), and categorization of modern standard Arabic verb valence based on Case Grammar as described by (Al-Qahtani, 2005).

In terms of representation, two methods have been popularly used: conceptual graph and semantic network. A conceptual graph (CG) is an abstract formalism for knowledge representation that consists of nodes known as concepts and conceptual relations, which are linked by edges. This structured representation has been introduced by John F. Sowa in 1976 (Sowa, 2007). At that point in time, CG is used to map natural language questions and assertion in order to build the conceptual schemas in database systems. Generally, CGs have been widely applied in various domain areas, for instance in artificial intelligence (AI), computer science and cognitive science (Sowa, 2007). The main key idea of using this structured representation is to be able to understand the complex Semantic Description (SD) of any information sources. As a result, CG has been a prominent knowledge representation since it is logically precise, readable and computationally tractable.

Several versions of CGs have been designed and implemented over the past thirty years. In the 1960s, graph-based semantic representations were popular among researchers especially in theoretical and computational linguistics. Semantic networks, correlation nets and dependency graphs are some variations of graph representations that rely on different notations. Each of these graph-based semantic representations allows different ways of structuring knowledge. For example semantic network used "*is a*" and "*a kind of*" notation to link two related concepts, meanwhile dependency graph connects different nodes using edges without any explanation on the arc. Regardless of difference in their notations, the early graph-based representation managed to capture the underlying knowledge. In this research work, semantic network has been explored and used to present the

extracted information related to female terms because it is easy to represent and the structure can be easily understood by a layman. In addition, semantic network in this research is used to present the extracted information related to female terms because of its advantages in representing knowledge concept. Specifically, the paper explains how information related to female terms is extracted from the Quran, identifies significant female issues based on the extracted information, and presents the issues using the most appropriate diagrammatic representation of verses in the Quran.

The paper is organized as follows. The next section explains the semantic network followed by the methodology that has been used to extract female terms, and identify significant issues. Then, an example of the extracted text from the Quran is shown, and discussion on how the extracted information is grouped into issues using semantic network is presented. Finally, the summary of things that have been achieved is presented.

II   SEMANTIC NETWORK

A semantic network is a graphical view of problem's important objects, properties and relationships. It views knowledge as a graph; with the nodes represent the facts or concepts and the arcs represent the relations or associations between concepts where both nodes and links are generally labeled (Luger, 2009; Hartley & Barnden, 1997; Sowa, 1987). Semantic network in ontology helps expresses vocabulary that is beneficial especially for human.

Conceptually, semantic network is represented in a diagram consists of nodes, links (edges) and link labels. Nodes can be drawn as circles or ellipses or rectangles. It represents objects such as physical objects, concepts or situations. Links is drawn as arrows, represents relationships between objects. Link labels specify particular relations. A concept of semantic network is illustrated in Figure 1.
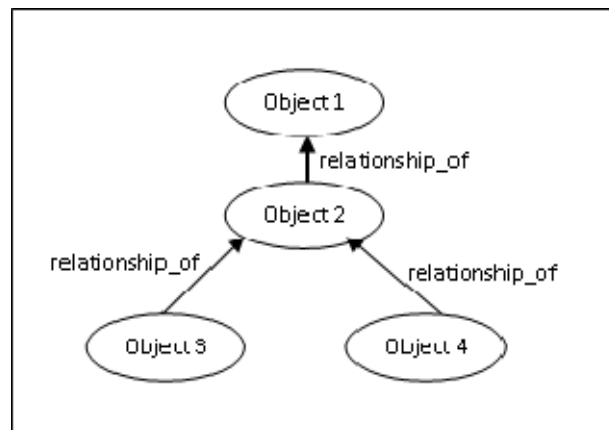

Figure 1. Semantic Network representation

The strength of semantic is that, it has the ability to represent default values for categories. For example, Object 2 in Figure 1 is a sub-object of Object 1 and will inherit features of Object 1, which in this case is referred as default value. It also can convey some meaning in a transparent manner. It has been widely used in AI applications as it is easy to translate into PROLOG.

III   METHOD

The method to present female related issues using semantic network consists of four (4) steps. The steps are i) identifying the appropriate Quran search engine website, ii) extraction of verses, iii) analysis of verse and identification of issue and iv) development of semantic network representation.

Many Quran search engines websites are available on the internet such as SearchTruth (www.searchtruth.com), Surah.My (www.surah.my), AL ISLAM (www.alislam.org/quran/search2), Guided Ways (www.guidedways.com/search.php), and IslamiCity.com (www.islamicity.com/QuranSearch). These search engines support multiple languages such as English, Arabic, French, Indonesia, Spanish, Malay and Urdu. The search engine is selected based on its capability to support search multi-word phrases (Nanba and Morishita, 2008), synonym search (Nadeem-Yasin et al., 2009), morphological search (Atwell et al., 2011), and misspellings (Rachidi et al., 2003). The terms woman, women, and girl have been used to compare the search engines based on the Tanzil Quran text features namely accuracy, searchability, compatibility and flexibility (Tanzil, 2011). After an appropriate Quran search engine website has been identified, the verses are extracted using female related terms.

This study has identified 16 terms as follows: women, girl, lady, mother, aunt, wife, sister, daughter, queen, whore, maid, niece, divorcee,

maiden, damsel and consorts. In extracting the terms, plural and singular forms of the words are taken into consideration. The extraction of verses had been performed using the search engine provided by individual Quran website. In this study, terms and words are used interchangeably. The verses are analyzed to identify issues and once issues are identified, semantic network representation is developed to represent the issues.

IV   FINDINGS AND DISCUSSION

Based on the evaluation of the search engines, Surah.My is found to be the most appropriate Quran search engine to be used in this study. In addition, an analysis through bizinformation.com.my shows that Surah.My is actively being used in Malaysia. The traffic report shows that the website is active and frequently accessed. This section presents results on i) extracted information based on female terms, ii) significant issues based on extracted information, and iii) semantic network representation.

A. Extracted information based on female terms

Verses are extracted from the Quran based on the female terms identified in the study. For example, the term 'female' when used in searching produced 32 verses taken from 23 surah. Table 1 shows samples of the extracted information based on the term 'female'.

Table 1. Sample of extracted information

Juzu'	Surah	Verse No	Verse
4	An-Nisaa	11	Allah (thus) directs you as regards your Children's (Inheritance): to the male, a portion equal to that of two females …….
6	Al-Maaidah	38	As to the thief, Male or female, cut off his or her hands: a punishment by way of example, from Allah, for their crime: and Allah is Exalted in power.

*Source : www.surah.my

B. Significant issues based on extracted information

The verses extracted were studied and issues related to the information in the verses were identified. Issues were identified based on selected keywords. Table 2 shows the examples of the extracted information and related issues.

Table 2. Examples of significant issues

Verse	Issues
Allah (thus) directs you as regards your Children's (Inheritance): to the male, a portion equal to that of two females …….	Inheritance
As to the thief, Male or female, cut off his or her hands: a punishment by way of example, from Allah, for their crime: and Allah is Exalted in power.	Punishment

C. Semantic network representation

A verse (An-Nisaa' 4:11) is used as an example to show the semantic network representation (Figure 2). The full verse is as follows:

"Allah (thus) directs you as regards your Children's (Inheritance): to the male, a portion equal to that of two females: if only daughters, two or more, their share is two-thirds of the inheritance; if only one, her share is a half. For parents, a sixth share of the inheritance to each, if the deceased left children; if no children, and the parents are the (only) heirs, the mother has a third; if the deceased Left brothers (or sisters) the mother has a sixth. (The distribution in all cases ('s) after the payment of legacies and debts. Ye know not whether your parents or your children are nearest to you in benefit. These are settled portions ordained by Allah. and Allah is All-knowing, All-wise" (Holy Quran, Surah An-nisaa', verse 11).

Figure 2 shows a semantic network on Surah An-nisaa' verse 11 (4:11) which was extracted for the term 'female'. The verse describes the *faraid* system for a deceased, specifically highlighting the portion of inheritance for the deceased children and parents. It also describes the allocation of inheritance in the case of a deceased with no heir. From the figure, all facts – physical objects and concept such as 'daughter', 'mother', 'half share' and 'two-thirds share' are represented as nodes. These facts can be considered as topics that can be used as keywords for searching. The arcs in the network describe the relationship of each node and can be used as a link in a situation where we have a number of verses highlighting similar issue.

The Holy Quran consists of verses which describes on various issues. Some of the issues are stressed a number of times in the Quran to indicate its importance. Having a graphical view of all the related verses on issues in the Holy Quran gives a clear picture on the issues described. This parallels with a statement by Sowa (1987) that network notations are easy for people to read as graphs keep all the information about an entity in a single node and show the related information by links connected directly to the node. Combining the representation of different verses is also easy as it did not disturb the structure of the existing networks.
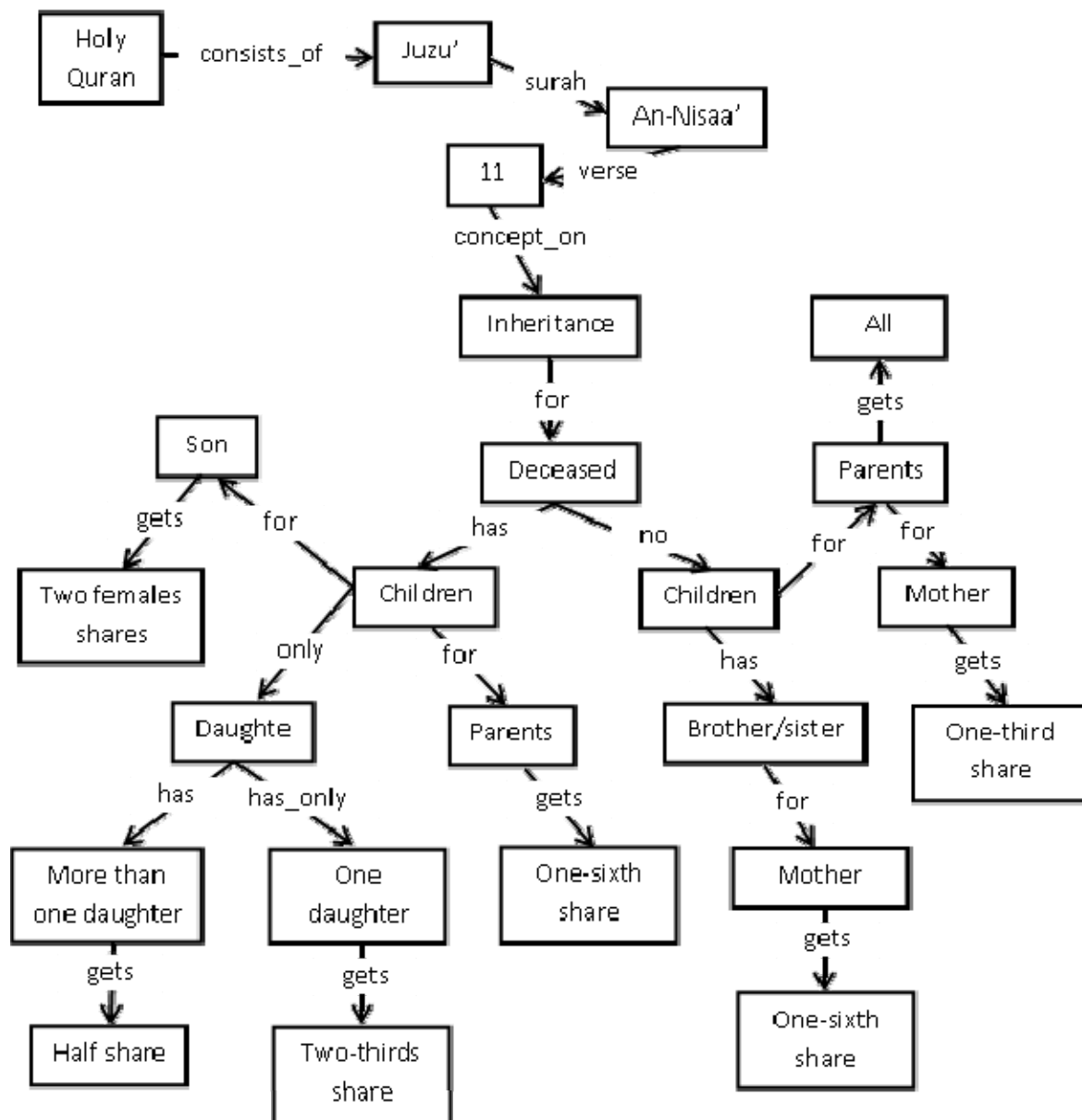

Figure 2. Semantic Network on Surah An-nisaa' verse 11 (4:11)

V   CONCLUSION

This study is essential in understanding the content of Quran since it is the main source of knowledge that can be used as guideline for everyday life of the Muslims. It contains valuable information and solution ranging from general to specific issues. Issues related to female are one of the major concerns that are addressed in Quran. Female is also being addressed by other terms such as women, woman, girls and other terms that reflect the female. Due to the varieties of terms being used in Quran, identifying and extracting the verses that contain the issues related to female are very difficult tasks. Hence, this study has identified 16 female related terms and the surah and verses that associated with the terms.

Semantic network provides visual presentation of the terms and its relationships with other terms. In this study, semantic network on Surah An-nisaa' verse 11 (4:11) has been developed to describes the *faraid* system. The *faraid* system is a complex Islamic inheritance system that deals with various levels of descendents. The issue has been represented and simplified using semantic network. Semantic network has been successfully applied to represent the female issue in *faraid* system. The network has clearly shown the portion of inheritance for the deceased descendents which involve children and parents. This visual information can be used as quick reference and serve as decision support tool for *faraid* related problem.

This study can be extended by applying CG interchange format to represent female issues in Quran. CG is another structured knowledge representation that is similar to semantic network. The efficacy of semantic network and CG will be further assessed.

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